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EXAMINER

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ART UNIT	PAPER NUMBER
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2154

DATE MAILED: 08/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/825,122

Applicant(s)

AIKEN ET AL.

Examiner

Aaron C Perez-Daple

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 April 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-31 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>4/3/01</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This Action is in response to Application filed 4/3/01, which has been fully considered.
2. Claims 1-31 are presented for examination.
3. This Action is non-Final.

Claim Objections

4. Claim 26 is objected to because of the following informalities: Claim 26 depends from claim 11 where it is clear from the limitations that it should depend from claim 12, otherwise proper antecedent basis would be lacking. Appropriate correction is required.
5. The numbering of claims is not in accordance with 37 CFR 1.126.

Specifically, Applicant has presented two claims 29. The second claim 29 should be renumbered as claim 31. For the purposes of applying prior art, the Examiner shall refer to the second claim 29 as claim 31.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
7. **Claims 1-11, 28 and 31** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 1, 28 and 31 recite "a plurality of request/response communications." It is not clear whether the recited communications are claimed as comprising at least one of requests and responses, or both. Therefore, the term

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“request/response” renders the claims indefinite. For the purpose of applying prior art, the Examiner interprets that the communications comprise at least one of requests and responses.

8. As dependent claims, claims 2-11 suffer from the same deficiencies as claim 1.

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. **Claims 1-9, 11, 28 and 31** are rejected under 35 U.S.C. 102(b) as being anticipated by Pai et al. (“Locality-Aware Request Distribution in Cluster-based Network Servers,” Proc. of the 8th International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS VIII), San Jose, CA, October, 1998) (hereinafter Pai).

11. As for claims 1, 28 and 31, Pai discloses a method of distributing Transmission Control Protocol (TCP) connections to a specific data processing system in a cluster of data processing systems, comprising:

establishing a TCP connection between a client and a first data processing system in the cluster of data processing systems (section 5, fifth paragraph, “Figure 15 depicts...e.g. LARD.”; Fig. 15);

obtaining information from the client over the TCP connection through a plurality of request/response communications with the client over the TCP connection (section 1, second

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paragraph, “With *content-based request*...audio and video).”; section 5, second paragraph, “A handoff protocol...with the client.”; Fig. 15);

evaluating the information obtained over the TCP connection to select a target data processing system in the cluster of data processing systems for the TCP connection (section 1, second paragraph, “With *content-based request*...audio and video).”; section 5, second paragraph, “A handoff protocol...with the client.”; Fig. 15); and

transferring the TCP connection from the first data processing system to the selected target data processing system so that the transfer of the TCP connection is transparent to the client (section 5, fifth paragraph, “Figure 15 depicts...e.g. LARD.”; Fig. 15).

12. As for claim 2, Pai discloses the method according to claim 1, wherein transferring the TCP connection from the first data processing system to the selected target data processing system comprises:

providing connection state information associated with the connection to the selected target data processing system (section 1, second paragraph, “With *content-based request*...audio and video).”; section 1, fourth paragraph, “Figure 1 illustrates...back-end node.”; section 5, fifth paragraph, “Figure 15 depicts...e.g. LARD.”); and

routing subsequent communications associated with the TCP connection to the selected target data processing system to transfer the TCP connection to the selected target data processing system (section 5, fifth paragraph, “Figure 15 depicts...e.g. LARD.”; Fig. 15).

13. As for claim 3, Pai discloses the method according to claim 2, wherein evaluating the information obtained over the TCP connection comprises:

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providing information received over the TCP connection to an application executing on the first data processing system (section 1, second paragraph, “With *content-based request*...audio and video).”; section 5, second paragraph, “A handoff protocol...with the client.”; Fig. 15);

wherein the application executing on the first data processing carries out the following:
evaluating the provided information to select a target instance of an application executing on a target data processing system (section 1, second paragraph, “With *content-based request*...audio and video).”; section 5, second paragraph, “A handoff protocol...with the client.”; Fig. 15); and

wherein transferring the TCP connection from the first data processing system to the selected target data processing system further comprises transferring the TCP connection to the selected target instance of the application executing on the target data processing system (section 1, fourth paragraph, “Figure 1 illustrates...back-end node.”; section 5, fifth paragraph, “Figure 15 depicts...e.g. LARD.”).

14. As for claim 4, Pai discloses the method of claim 3, further comprising:

notifying the selected target instance of the application executing on the target data processing system of a request to transfer the TCP connection to the selected target instance of the application (section 5, fifth paragraph, “Figure 15 depicts...e.g. LARD.”; Fig. 15);

receiving a confirmation of acceptance of the transfer of the TCP connection by the selected target instance of the application (section 5, fifth paragraph, “Figure 15 depicts...e.g. LARD.”; Fig. 15); and

wherein transferring the TCP connection to the selected target instance of the application executing on the target data processing system comprises transferring the TCP connection to the selected target instance of the application executing on the target data processing system if the confirmation of acceptance indicates that the selected target instance of the application accepts the transfer of the TCP connection (section 5, fifth paragraph, “Figure 15 depicts...e.g. LARD.”; Fig. 15).

15. As for claim 5, Pai discloses the method of claim 3, wherein the target instance of the application executing on the target data processing system comprises a web server (section 1, 7th paragraph, “Increasing a server’s....they supersede.”).

16. As for claim 6, Pai discloses the method of claim 3, wherein the application executing on the first data processing system further carries out the following:

determining application state information based on the provided information and the selected target instance of the application (section 1, second paragraph, “With *content-based request*...audio and video).”; section 5, second paragraph, “A handoff protocol...with the client.”; Fig. 15); and

wherein transferring the TCP connection from the first data processing system to the selected target data processing system further comprises providing the application state information to the selected target instance of the application executing on the target data processing system (section 1, second paragraph, “With *content-based request*...audio and video).”; section 1, fourth paragraph, “Figure 1 illustrates...back-end node.”; section 5, second paragraph, “A handoff protocol...with the client.”; Fig. 15).

17. As for claim 7, Pai discloses the method of claim 6, wherein the selected target instance of the application executing on the target data processing system carries out the following:
- receiving the application state information (section 1, fourth paragraph, "Figure 1 illustrates...back-end node."; section 5, second paragraph, "A handoff protocol...with the client."; section 5, fifth paragraph, "Figure 15 depicts...e.g. LARD."); and
- establishing a state of the target instance of the application based on the received application state information such that the transfer of the TCP connection to the target instance of the application is transparent to the client (section 5, "In this section...of this work."; Fig. 15).
18. As for claim 8, Pai discloses the method of claim 6, wherein the application executing on the first data processing system and the target instance of the application executing on the target data processing system are instances of the same application (section 5, "In this section...of this work.").
19. As for claim 9, Pai discloses the method of claim 6, wherein the application executing on the first data processing system comprises a routing application (see Abstract, "We consider...client-transparent manner.").
20. As for claim 11, Pai discloses the method of claim 1, wherein obtaining information from the client includes peeking at information provided over the TCP connection, and wherein transferring the TCP connection further comprises providing the obtained information to the selected target data processing system (section 1, second paragraph, "With *content-based request*...audio and video)."; section 1, fourth paragraph, "Figure 1 illustrates...back-end node."; section 5, second paragraph, "A handoff protocol...with the client."; Fig. 15).

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21. **Claims 12-14, 16, 26, 27, 29 and 30** are rejected under 35 U.S.C. 102(b) as being anticipated by Alteon (Brochure entitled, "Enhancing Web User Experience with Global Server Load Balancing," Alteon WebSystems, San Jose, CA, June 1999.) (hereinafter Alteon).
22. **Examiner's Interpretation:** With respect to the recited "routing communication protocol stack" the Examiner interprets that this is inherent to any device capable of communicating on a network. As understood by one of ordinary skill in the art, the term "routing communication protocol stack" refers to the layering of protocols used for the routing of packets (e.g. communications) on a network. See cited definition from TechDictionary.com. Note that TCP/IP is explicitly provided as an example of a network transmission model having a protocol stack. This interpretation is consistent with the discussion on pages 2-3 of the specification, which further comprise admitted prior art.
23. As for claims 12, 29 and 30, Alteon disclose a method of transferring a Transmission Control Protocol (TCP) connection to a specific data processing system in a cluster of data processing systems, the cluster of data processing systems having an associated dynamically routable virtual Internet Protocol address (DVIPA), the method comprising:
- establishing a connection utilizing the DVIPA between a client and a routing application utilizing a routing communication protocol stack at a first data processing system in the cluster of data processing systems (pg. 5, fourth and fifth paragraphs, "The Web Switch...server's MAC address.");
- wherein the routing application carries out the following:

obtaining information from the client over the connection to the routing application (pgs. 9-11, Persistence Policies, "Many e-commerce...on the server.");

selecting a target application for transfer of the connection based on the obtained information (pgs. 9-11, Persistence Policies, "Many e-commerce...on the server."); and

notifying the routing communication protocol stack of the selected target application (pg. 11, last paragraph, "The example in...to VSG C."; Fig. 3);

wherein the routing communication protocol stack carries out the following:

sending a connection transfer message to a target communication protocol stack associated with the selected target application, the connection transfer message containing connection state information associated with the connection to the routing application; and

routing subsequent communications over the connection to the target communication protocol stack (pgs. 9-11, Persistence Policies, "Many e-commerce...on the server.");

wherein the target communication protocol stack carries out the following:

notifying the target application of the transfer of the connection to the target application; and setting a state of a connection to the target application to the state specified by the connection state information associated with the connection to provide a transferred connection to the target application (pgs. 9-11, Persistence Policies, "Many e-commerce...on the server."); and

wherein the target application carries out communicating with the client utilizing the transferred connection (pgs. 9-11, Persistence Policies, "Many e-commerce...to VSG C."; Fig. 3).

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24. As for claim 13, Alteon discloses the method of claim 12, wherein the routing application further carries out providing application state information to the routing communication protocol stack, the application state information specifying a state of the selected target application based on the information from the client;

wherein the routing communication protocol stack further carries out providing the application state information to the target communication protocol stack (pgs. 9-11, Persistence Policies, "Many e-commerce...to VSG C."; Fig. 3);

wherein the target communication protocol stack further carries out providing the application state information to the target application (pgs. 9-11, Persistence Policies, "Many e-commerce...to VSG C."; Fig. 3); and

wherein the target application further carries out resuming communications with the client from the application state specified by the provided application state information utilizing the transferred connection (pgs. 9-11, Persistence Policies, "Many e-commerce...to VSG C."; Fig. 3).

25. As for claim 14, Alteon discloses the method of claim 12, wherein the target application further carries out sending a response message to the routing application, the response message indicating whether the target application accepts the transfer of the connection (pg. 7, TCP Connection Monitoring, "A more sophisticated...newly available server.").

26. As for claim 16, Alteon discloses the method of claim 14, wherein the routing application further carries out:

selecting a second target application if the response message does not accept the transfer of the connection (pgs. 6-7, "The most important...newly available server."); and

notifying the routing communication protocol stack of the selection of the second target application so as to initiate transfer of the connection to the second selected target application (pgs. 6-7, "The most important...newly available server.").

27. As for claim 26, Alteon discloses the method of claims 11 and 12, wherein the routing communication protocol stack further carries out updating a connection routing table associated with the routing communication protocol stack to route communications to the transferred connection to the target communication protocol stack (pg. 5, paragraphs 4-8, "The Web Switch...its binding table.").
28. As for claim 27, Alteon discloses the method of claim 12, wherein obtaining information from the client comprises peeking information obtained over the connection and wherein the connection transfer message further includes the obtained information (pgs. 9-11, Persistence Policies, "Many e-commerce...to VSG C."; Fig. 3).

Claim Rejections - 35 USC § 103

29. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

30. **Claim 10** is rejected under 35 U.S.C. 103(a) as being unpatentable over Pai in view of Aron et al. ("Efficient Support for P-HTTP in Cluster-Based Web Servers," Proc. of 199 Annual Usenix Technical Conference, Monterey, CA, June 1999.) (hereinafter Aron).

31. As for claim 10, Pai does not specifically disclose transferring the TCP connection from the selected data processing system to a second data processing system. Aron disclose the system of Pai further comprising transferring the TCP connection from the selected data processing system to a second data processing system for the purpose of efficiently handling P-HTTP persistent client connections (section 3.1, "A simple client-transparent...scalable mechanisms."; Fig. 2). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Pai by transferring the TCP connection from the selected data processing system to a second data processing system for the purpose of efficiently handling P-HTTP persistent client connections, as taught by Aron above.
32. **Claim 17** is rejected under 35 U.S.C. 103(a) as being unpatentable over Alteon in view of Sheh et al. (US 5,754,752) (hereinafter Sheh).
33. As for claim 17, although arguably inherent to Alteon, Alteon does not explicitly disclose sending an error message to the client over the connection if the response message indicates that the transfer of the connection is not accepted. Sheh teaches sending an error message to a client over a connection if a response message indicates that a transfer of a connection is not accepted in order to recover a session with minimal data loss (see abstract). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Alteon by sending an error message to the client over the connection if the response message indicates that the transfer of the connection is not accepted in order to recover a session with minimal data loss, as taught by Sheh above.

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34. **Claims 15 and 18-24** are rejected under 35 U.S.C. 103(a) as being unpatentable over Alteon in view of Logan et al. (US 6,578,066 B1) (hereinafter Logan) and in further view of Walker (US 5,867,636) (hereinafter Walker).
35. **Examiner's Interpretation:** The Examiner considers the recited "socket" and "control socket" to be inherent to Alteon. Logan and Walker are cited primarily in support of this inherency. Specifically, col. 4, lines 42-43 define a socket as a port identifier and IP-address taken together. As such, sockets are inherent for TCP/IP communications in order to identify the endpoints of the connection. The Examiner uses this definition in the rejection of the claims. Col. 4, lines 17-62, of Walker details typical services (i.e. software functions) that are associated with socket interfaces in TCP/IP connections, among others. As understood by one of ordinary skill in the art, these functions are used to regulate the connections between devices on the network. The Examiner takes the position that the functions disclosed by Walker are inherent to Alteon. However, at a minimum, it would have been obvious to one of ordinary skill in the art to use these functions to regulate the TCP/IP connections.
36. As for claim 15, Alteon discloses the method of claim 14, wherein the routing application further carries out closing a socket associated with the connection if the response message from the target application indicates that the target application accepts the transfer of the connection (pgs. 9-11, Persistence Policies, "Many e-commerce...to VSG C."; Fig. 3).
37. As for claim 18, Alteon discloses the method of claim 12, wherein the routing application further carries out opening a control socket to the routing communication protocol stack so as to allow bi-directional communication between the routing communication protocol stack

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and the routing application (pgs. 9-11, Persistence Policies, "Many e-commerce...to VSG C."; Fig. 3).

38. As for claim 19, Alteon discloses the method of claim 18, wherein the target application further carries out opening a control socket to the target communication protocol stack to allow bi-directional communication between the target application and the target communication protocol stack (pgs. 9-11, Persistence Policies, "Many e-commerce...to VSG C."; Fig. 3).
39. As for claim 20, Alteon discloses the method of claim 18, wherein the routing application is identified to the routing communication protocol stack as a routing application when the routing application opens the control socket (pgs. 9-11, Persistence Policies, "Many e-commerce...to VSG C."; Fig. 3).
40. As for claim 21, Alteon discloses the method of claim 20, wherein the routing communication protocol stack further carries out providing the routing application with an identification of potential target applications listening to the DVIPA by utilizing the control socket (pg. 5, paragraphs 4-8, "The Web Switch...its binding table."; pgs. 9-11, Persistence Policies, "Many e-commerce...to VSG C."; Fig. 3).
41. As for claim 22, Alteon discloses the method of claim 21, wherein the routing communication protocol stack further carries out updating the routing application with identifications of potential target applications listening to the DVIPA by utilizing the control socket (pg. 5, paragraphs 4-8, "The Web Switch...its binding table."; pgs. 9-11, Persistence Policies, "Many e-commerce...to VSG C."; Fig. 3).

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42. As for claim 23, Alteon discloses the method of claim 21, wherein the cluster of data processing system includes a plurality of communication protocol stacks and a corresponding plurality of associated applications listening to the DVIPA and wherein the plurality of communication protocol stacks carry out notifying the routing communication protocol stack if a corresponding application is listening to the DVIPA (pg. 5, paragraphs 4-8, "The Web Switch...its binding table."; pgs. 9-11, Persistence Policies, "Many e-commerce...to VSG C."; Fig. 3).
43. As for claim 24, Alteon discloses the method of claim 19, wherein opening a control socket comprises opening a User Datagram Protocol (UDP) socket (pgs. 5-6, UDP/IP Server Load-Balancing Operation, "Because UDP is...particular real server.").
44. **Claim 25** is rejected under 35 U.S.C. 103(a) as being unpatentable over Alteon in view of Cotner et al. (US 6,031,978) (hereinafter Cotner).
45. As for claim 25, Alteon does not specifically disclose that the cluster of data processing systems may comprise a SYSPLEX cluster. Cotner teaches that it is well known in the art to use a data processing system comprising a SYSPLEX cluster for the purpose of allowing parallel processing (col. 1, lines 19-27, "The term 'sysplex'...transaction workloads."). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Alteon by using a SYSPLEX cluster in order to employ parallel processing, as taught by Cotner above.


Conclusion

46. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US 2002/0091831 A1, note TCP sockets method; US 6330,560 B1, note TCP/IP connection management system; US 6,252,878 B1, note Fig. 1; US 6,247,057 B1, note virtual addressing method; US 5,740,371, note abstract; US 6,587,866 B1, note Fig. 1; US 6,446,225 B1, note session management system; EP 0648038 A2, note Fig. 1; US 5,941,988, note TCP gluing; Search results for protocol stack, www.techdictionary.com, visited 7/29/04; Stevens, "TCP/IP Illustrated, Vol. 1: The Protocols," Addison-Wesley, New York, 1994, pgs. 254-260, note teaches establishing separate server process for each TCP/IP connection.
47. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Aaron C Perez-Daple whose telephone number is (703) 305-4897. The examiner can normally be reached on 9am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Follansbee can be reached on (703) 305-8498. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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 7/29/04

Aaron Perez-Daple



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